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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/661,213	09/12/2003	Dennis Francis Grosjean	INN 001 PA	7184
29673	7590	03/21/2005	EXAMINER	
STEVENS & SHOWALTER LLP 7019 CORPORATE WAY DAYTON, OH 45459-4238			BARBEE, MANUEL L	
			ART UNIT	PAPER NUMBER
			2857	

DATE MAILED: 03/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/661,213	Applicant(s) GROSJEAN, DENNIS FRANCIS	
	Examiner Manuel L. Barbee	Art Unit 2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 December 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>12/31/03</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

On page 5, in the paragraph beginning at line 5, it suggested that references to types of gears and pinions be amended so that they are not confused with drawing reference numbers. For example, on page 5, line 5, "9 tooth", should be --9-tooth-- or --nine tooth--.

On page 5, line 30, delete "predicable", and insert --predictable--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claim 12 is rejected under 35 U.S.C. 102(e) as being anticipated by Palanisamy et al. (US Patent No. 6,553,816).

With regard to sensing a current drawn by a motor, as shown in claim 12, Palanisamy et al. teach getting time domain current information from a starter motor (Abstract). With regard to identifying a characteristic in the current waveform corresponding to a predetermined change in position of the motor and normalizing the

current waveform to the spatial change of the motor, as shown in claim 12, Palanisamy et al. teach using crank position data to transform the time domain current waveform to the spatial domain (Abstract; col. 2, lines 3-29). Since the crank's position would be directly related to the position of the motor, the spatial domain data would be normalized to the change of position of the motor.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 4-7 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Palanisamy et al. in view of Kliman (US Patent No. 6,199,023).

With regard to sensing a current drawn by a motor and normalizing the current waveform to the rotation of the motor, as shown in claim 1, Palanisamy teach getting time domain current information from a starter motor and using crank position data to transform the time domain current waveform to the spatial domain (Abstract; col. 2, lines 3-29). Palanisamy et al. do not teach identifying oscillations caused by segment switching and determining a number of oscillations corresponding to one rotations of the motor, as shown in claim 1.

Kliman teaches determining the current produced by a motor absent other spurious signatures using a model (col. 2, lines 34-51). Since this ideal signal is

subtracted from the real measured current signal in order to see the spurious signals, the ideal motor signal would contain oscillations caused by segment switching and corresponding to one rotation of the motor. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the diagnostic method, as taught by Palanisamy et al., to include the ideal motor model, as taught by Kliman, because then the signals to be analyzed would have been easily seen (Kliman, col. 1, line 60 - col. 2, line 23).

Palanisamy et al. does not teach filtering the current waveform, as shown in claim 4. Kliman teaches filtering the model motor current from the measured motor current (Fig. 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the diagnostic method, as taught by Palanisamy et al., to include filtering the model motor current from the measured motor current, as taught by Kliman, because then the signals to be analyzed would have been easily seen (Kliman, col. 1, line 60 - col. 2, line 23).

With regard to performing frequency analysis on the normalized waveform, and calculating frequency dependent distribution, as shown in claim 5 and 6, and performing frequency analysis over the entire normalized waveform, as shown in claim 9, Palanisamy et al. teach using Fourier Transformation techniques on the waveform (col. 3, lines 60-67; col. 4, line 51 - col. 5, line 7). With regard to identifying frequencies associated with components of the system and evaluating energy content of the waveforms, as shown in claim 7, and identifying system characteristics corresponding to identifiable rotations positions of the motor, as shown in claim 11, Palanisamy et al.

teach deconvolving waveform information to provide engine status and diagnostic information (col. 5, lines 17-22).

With regard to performing frequency analysis on each part of a waveform divided into discrete overlapping parts, as shown in claim 10, Palanisamy et al. teach deconvolving the waveform into its component parts for separating the effects of overlapping piston influences (col. 3, lines 60-67; col. 4, line 51 - col. 5, line 7).

6. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Palanisamy et al. in view of Kliman as applied to claim 1 above, and further in view of Devaney et al. (US Patent Application Publication 2002/0186039).

Palanisamy et al. and Kliman teach all the limitations of claim 1 upon which claim 2 depends. Palanisamy et al. and Kliman do not teach a predetermined number of regular spaced data points for one rotation of the motor, as shown in claim 2. Devaney et al. teach using 512 points per cycle for capturing a current (par. 36). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the diagnostic combination, as taught by Palanisamy et al. and Kliman, to include capturing a transient using 512 points per cycle, as taught by Devaney et al., because an adequate amount of signal information would have been captured.

7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Palanisamy et al. in view of Kliman and Devaney et al. as applied to claims 1 and 2 above, and further in view of Rabin et al. (US Patent No. 6,051,943).

Palanisamy et al., Kliman and Devaney et al. teach all the limitations of claims 1 and 2 upon which claim 3 depends. Palanisamy et al., Kliman and Devaney et al. do

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not teach interpolating the current waveform to determine a value for each data point, as shown in claim 3. Rabin et al. teach interpolating between sensor transitions (col. 5, lines 47-64). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the diagnostic combination, as taught by Palanisamy et al., Kliman and Devaney et al., to include interpolating between sensor transitions, as taught by Rabin et al., because then some data points could have been determined after measuring the current waveform.

8. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Palanisamy et al. in view of Kliman as applied to claims 1, 5 and 6 above, and further in view of Strunk et al. (US Patent No. 4,744,041).

Palanisamy et al. and Kliman teach all the limitations of claims 1, 5 and 6 upon which claim 8 depends. Palanisamy et al. and Kliman do not teach a power-spectral-density of the normalized waveform, as shown in claim 8. Strunk et al. teach using a fast fourier transform to determine the power-spectral-density (PSD) of a current waveform (Abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the diagnostic combination, as taught by Palanisamy et al. and Kliman, to include a PSD of the current waveform, because then the testing would not have needed a mechanical connection to the motor (Strunk et al., col. 2, lines 41-54).

9. Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Palanisamy et al. in view of Devaney et al.

Palanisamy et al. teach all the limitations of claim 12 upon which claims 13-16 depends, as shown above. Further, with regard to frequency analysis of the sets of data points with reference to rotation of the motor, as shown in claims 14 and 15, Palanisamy et al. teach using Fourier Transformation techniques on the waveform (col. 3, lines 60-67; col. 4, line 51 - col. 5, line 7). With regard to dividing the waveform into discrete parts corresponding to a position of a first component and identifying at least one defect of a second component, as shown in claim 16, Palanisamy et al. teach deconvolving the waveform into separate parts to determine the effect on piston influences (col. 4, line 51 - col. 5, line 22).

Palanisamy et al. do not teach a predetermined number of points, as shown in claim 13. Devaney et al. teach using 512 points per cycle for capturing a current (par. 36). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the diagnostic method, as taught by Palanisamy et al., to include capturing a transient using 512 points per cycle, as taught by Devaney et al., because an adequate amount of signal information would have been captured.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Manuel L. Barbee whose telephone number is 571-272-2212. The examiner can normally be reached on Monday-Friday from 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on 571-272-2216. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

mlb
March 9, 2005


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